

IN THE CLAIMS

78. (New) A system for vectoring a primary flow in three dimensions by varying an effective throat or sonic plane within a ducted primary flow, comprising:

an opening for accepting the primary flow;

at least one primary injector located wherein said at least one injector is inclined to oppose the primary flow up-stream of said effective throat or sonic plane;

at least one supplemental injector and wherein said at least one supplemental injector is located downstream of the at least one primary injector, wherein said at least one supplemental injector opposes the primary flow in the intended vectoring plane, wherein said injector opposes the primary flow and wherein the at least one primary and supplemental injectors provide a flow field opposed to a subsonic portion of the primary flow in order to vector the primary flow; and

at least one controller operable to direct said at least one primary and supplemental injector to provide a flow operable to vary the effective throat or sonic plane.


79. (New) A method for vectoring a primary flow of fluid in a 3-D nozzle, comprising the steps of:

injecting fluid from a plurality of primary injectors wherein said injectors are opposed to a primary flow of the fluid and parallel to an intended vectoring plane, the plurality of injectors located proximate to a throat;

injecting fluid from a plurality of supplemental injectors opposed to the primary flow wherein said second plurality of supplemental injectors are located downstream of the throat, and wherein the fluid injected by said primary and/or supplemental injectors varies or skews in three dimensions an effective throat or sonic plane of said 3-D nozzle.

80. (New) A system for vectoring a primary flow comprising:
a three dimensional nozzle having an inner surface and a throat, wherein the throat comprises a region within the three dimensional nozzle of lowest cross-sectional area, the throat being situated in a path of the primary flow of fluid;

a plurality of primary injectors arranged along the inner surface of the three dimensional nozzle, the plurality of injectors are individually arranged to oppose the primary flow of fluid in a first intended vectoring plane, and wherein said primary injectors skew an effective throat or sonic plane within said three dimensional nozzle.



81. (New) A method for vectoring a primary flow within a three dimensional nozzle comprising the steps of:

injecting from a plurality of primary injectors a fluid opposed to the primary flow wherein said plurality of primary injectors are located proximate to a throat of the nozzle;

injecting from a plurality of supplemental injectors fluid to oppose the primary flow, the plurality of supplemental injectors located downstream of the throat and are individually aligned to oppose said primary flow, wherein said injected fluid skews or varies an effective throat or sonic plane within the three dimensional nozzle.

82. (New) A method for designing a nozzle, the method comprising:
analyzing a baseline configuration of the nozzle;
establishing a design study matrix of experimental configurations, the design study matrix comprising the experimental configurations, each of the experimental configurations being different by at least one value of one or more matrix variables;
conducting computational fluid dynamic analysis on the experimental configurations;
identifying effects of the matrix variables on behavior of the experimental configurations;
constructing an enhanced configuration; and
evaluating the enhanced configuration.